DATA EVALUATION RECORD

STUDY 13

CHEM 036101 Trifluralin §164-1

FORMULATION--04--GRANULAR (G)

STUDY ID 41781901
Decker, O.D. 1990. Field dissipation of trifluralin following application of Treflan to alfalfa stubble. Laboratory ID No. AAC8805. Unpublished study performed by DowElanco, Greenfield, IN, and submitted by the Trifluralin Data Development Consortium, Indianapolis, IN.

DIRECT REVIEW TIME = 12

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CONCLUSIONS:

Field Dissipation - Terrestrial

This terrestrial field dissipation study is scientifically valid and can be used as supplemental data. However, it cannot be used to fulfill data requirements (164-1) for the following reasons:

In order to validate the analytical data, the separatory GC data should be confirmed by another analytical methodology (preferably MS).

Degradates identified in laboratory data were not analyzed for in field samples, and the degradation pathway of trifluralin in the field could not be determined from this study (See Comments for details).

Trifluralin (granular formulation) dissipated with a reported half-life of 49 days in the top 6" of soil when applied to loamy sand soil in California. Pretreatment indicated there were low levels (0.07-0.16 ppm) of trifluralin present in the 0-6" soil depth. Immediately posttreatment concentrations ranged from 1.30 to 6.30 ppm and 1.80 to 5.00 ppm for applications 1 and 2, respectively. By days 14 and 42 posttreatment the average recoverage was 1.14 ppm (range of 0.88-1.30) and 0.74 ppm (range of 0.38-1.90), respectively. The half-life of trifluralin was determined from dissipation curves (first order kinetics) using days Vs concentration on a semilogarithmic scale. Trifluralin was not detected below the 0-6" soil depth except for one sample which was discernible at the detection limit.

For complete fulfillment of the terrestrial field dissipation data requirement, acceptable data must be submitted for two sites treated at the maximum registered application rate for each trifluralin formulation type.

METHODOLOGY:

Alfalfa stubble plots of loamy sand (79% sand, 14% silt, 7% clay, 1.0% organic matter, pH 7.4, CEC 3.4 meq/100 g) located in Fresno, California, were treated with two applications of trifluralin (Treflan TR-10, 10% G, DowElanco) at 2.0 lbs ai/A/application (4 lb ai/A total) on February 17, 1988, and May 6, 1988, using a tractor-mounted granular spreader. An untreated plot located 175 feet north of the treated area was used as a control. Each plot (30 x 40 foot) was subdivided into a 20 x 20 foot sampling area with a 20-foot buffer area between plots (Figure IV). Soil samples were collected from the treated and control plots to a maximum depth of 36 inches, and the samples were divided into 6-inch segments. Soil cores from the 0- to 6-inch soil depth were collected using a 3.625-inch (diameter) by 6-inch sampling tube; cores from the 6- to 36-inch depths were collected using a zero-contamination probe (1.165-inch or 0.85 inch diameter) equipped with an acetate liner. Following each soil sampling, a sleeve was placed in the hole and the hole was vacuumed with a portable vacuum cleaner to remove any soil or debris that may have fallen in during soil sampling or insertion of the sleeve. The sleeves were removed, and the hole was filled with untreated soil and marked. Soil samples (0- to 24-inch depth) were collected from the treated and control plots prior to and immediately following each treatment, and at 9, 14, 42, 69, 139, and 243 days after the second application. Deeper soil samples (24- to 36-inch depth) were collected at 243 days after the second application. Immediately after collection, each soil sample was divided, and the segments were transferred to brown glass pint jars; acetonitrile: water (99:1, v:v) was added and the jars were capped (foil-lined caps) and shaken. The soil extracts were then shipped (5 to 10 days transport time) to the analytical laboratory, where they were stored at 4°C for up to 57 days prior to analysis.

The soil samples were analyzed according to the DowElanco Method Number AM-AA-CA-R116-AA-775. Subsamples of soil were extracted with acetonitrile: water (99:1, v:v) by shaking for 15 minutes. An aliquot was filtered (when necessary) and diluted with deionized water to twice volume. The extract was filtered through a C-18 column, and eluted with toluene. The eluate

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was vortexed and an aliquot was analyzed by GC with electron capture detection. Recovery efficiencies from soil samples fortified with trifluralin at 0.1 ppm and analyzed concurrently with the field samples ranged from 74 to 119% (Table IX). The method detection limit was 0.01 ppm. Soil samples were fortified with 0.20, 1.0, and 2.0 ppm trifluralin in the field and were shipped and stored with actual samples; recoveries from these samples were 83-110% (Table VIII).

DATA SUMMARY:

Trifluralin (Treflan TR-10, 10% G), at 4.00 lbs ai/A, dissipated with a registrant-calculated half-life of 49 days from the upper 6 inches of a plot of loamy sand soil planted to alfalfa in California. In the 0- to 6-inch depth, trifluralin was 0.07-0.16 lb ai/A in the soil prior to the first treatment (Table X). Immediately after the first treatment, trifluralin was 0.91-6.30 lb ai/A and declined to 0.30-1.70 lb ai/A at one day prior to the second treatment. After the second treatment, trifluralin was 1.60-5.00 lb ai/A immediately posttreatment, 0.99-2.30 at 9 days, 0.38-1.90 at 42 days and declined to 0.06-0.12 lb ai/A at 243 days. Trifluralin was not detected (<0.02 lb ai/A) in soil depths below 6 inches, except for one pretreatment soil sample which contained 0.04 lb ai/A in the 6- to 12-inch depth (Table X).

Samples spiked in the field had recoveries of 83-110% (Table VIII). Soil samples spiked in the lab to measure procedural recoveries had recoveries of 74-119% (Table IX).

During the study, air temperatures ranged from 27-109 F, and soil temperatures (4-inch depth) ranged from 41-96°F. Cumulative precipitation plus irrigation totaled 88.95 inches. The slope of the field was 0.5%, and the depth to the water table was 50 feet.

COMMENTS:

1. Degradates (a,a,a-trifluoro-2,6-dinitro-N-propyl-p-toluidine, a,a,a-trifluoro-5-nitro-4-propyl-toluene-3,4-diamine, 2-ethyl-7-nitro-1-propyl-5-(trifluoromethyl) benzimidazole-3-oxide, 2-ethyl-7-nitro-1-propyl-5-(trifluoromethyl)benzimidazole, 2-ethyl-7-nitro-5-(trifluoromethyl)benzimidazole; a,a,a-trifluoro-2,6-dinitro-p-cresol, and 2,2'-azoxybis(a,a,a-tri-fluoro-6-nitro-N-propyl-p-toluidine) were identified at maximum concentrations of 0.092-0.006 ppm (4.6%, 2.1%, 0.3%, 1.0%, 2.6%, 2.7% and 3.0%, respectively, of applied radioactivity) in aerobic metabolism study (MRID 41240501). Furthermore, the major degradates identified in anaerobic metabolism were a,a,a-trifluoro-5-nitro-N4, N4-dipropyl-toluene-3,4-diamine (which reached a maximum concentration of 5.4% (0.104 ppm) and 13.2% (0.264 ppm) of the applied radioactivity in the sandy loam soil and clay loam soil, respectively, at Day 60 postflooding, and 11.6% in the loam soil at Day 30 postflooding), 7-amino-2-ethyl-1-propyl-5-(trifluoromethyl) benzimidazole (which reached 7.3% in the sandy loam soil and 8.3% in

the loam and clay loam soils at Day 60 postflooding), and a,a,a-trifluoro-N4,N4-dipropyltoluene-3,4,5-triamine (which reached 0.3% in the sandy loam soil, 4.1% in the loam soil, and 2.6% in the clay loam soil). Other degradates identified in the anaerobic metabolism study were a,a,a-trifluoro-2,6-dinitro-N-propyl-p-toluidine, a,a,a-trifluoro-5-nitro-N4-propyl-toluene-3,4-diamine, 2-ethyl-7-nitro-1-propyl-5-(trifluoromethyl)benzimidazole, and 2,2'-azoxybis(a,a,a-trifluoro-6-nitro-N-propyl-p-toluidine), which were each present at concentrations $\leq$2.1% (0.042 ppm) of the initial radioactivity. Degradates, 2-ethyl-7-nitro-1-propyl-5-(trifluoromethyl)benzimidazole-3-oxide and 7-amino-2-ethyl-5-(trifluoromethyl)benzimidazole, were each present at $\leq$1.0% of the initial radioactivity.

2. Acceptable storage stability data for trifluralin were submitted to the EPA (Study 1, Decker D.O., MRID 41661101, reviewed by Dynamac and submitted to the EPA on May 2, 1991). In this ancillary freezer storage stability study, trifluralin was stable in acetonitrile:soil slurries stored at 4 C for up to 454 days. In the current study, acetonitrile:soil slurries were stored at 4°C for a maximum of 57 days.

3. EFGWB prefers that residues in samples be separated by chromatographic methods (such as TLC, HPLC, and GC) solvent systems of different polarity, and that specific compounds isolated by chromatography be identified using a confirmatory method such as MS in addition to comparison to the R_f of reference standards.

   In this study aliquots of the extracts were analyzed by GC.

4. In 1985 and 1986, the study plots were planted to cotton and were treated with trifluralin at 0.75 lb ai/A. In 1987, the area was planted to alfalfa and treated with chlorpyrifos at 0.5 lb ai/A.

5. Ground water (pH 7.5) was used as irrigation water for these plots.

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